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Priority: Normal
Receipt requested
Subject: Docket 29547 207 Minutes ETOPS Operation Approval Criteria

Dear Sir,

Please find attached, UK CAA Comments on Docket 29547 - 207 Minutes ETOPS Operation Approval Criteria.

Thankyou

Yours Faithfully

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CIVIL AVIATION AUTHORITY

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VIA EMAIL 9-NPRM-CMTS@faa.gov (TOTAL 4 PAGES) & AIRMAIL

Our Ref: 9/61/10CD

9th June 1999

Federal Aviation Administration (FAA)
Office of Chief Counsel,
Rules Docket Office (29547)
Attn: Rules Docket No. 29547
800 Independence Avenue, SW
Room 915-G
Washington DC 20591

Dear Sir,

ATTENTION RULES DOCKET NO: 29547
207-MINUTE EXTENDED RANGE OPERATION WITH TWO-ENGINE AIRCRAFT (ETOPS) OPERATION APPROVAL CRITERIA

Please accept the comments attached below on the Request for Public Comment.

Thank you for the opportunity to take part in your rulemaking process.

Yours faithfully,

M Poole
Requirements and Policy Unit

Comments on Docket No 29547 207 Minute ETOPS Operations Approval Criteria

The following comments relate to the Approval Basis shown on Page 2 of the Notice.

Item 1

Although it is agreed that SATCOM voice and data link may be required to ensure reliable communications, other forms of communication suitable for the intended area of operators may also be appropriate. An assessment of the communications needs and capability should be called for and then suitable additional communications provided to meet the needs. In addition any long range communication systems should be capable of being powered from the normal and standby (emergency) electrical power sources.

Item 3

The item refers to the operator having "single engine automated capability on the airplane.. . . . .".

Should this be amended to say "The airplane shall have single engine autoland capability which must be operable for dispatch"?

Item 4

See comment on Item 1 above.

The re-assessment of ETOPS significant systems in accordance with Item 7-1 (see below) may dictate the need for a revised MMEL and CMP document.

The APU, its generator and its bleed capability should all be operable for despatch. If the APU start reliability is not sufficient (cannot be demonstrated) to ensure the required safety objectives for loss of the electrical or bleed sources are achieved (following SSA re-assessment see 7-1 below) then continuous operation to the APU throughout the flight may be required.

Item 7, Second Introductory paragraph

It is felt that this paragraph needs to be more detailed and explicit with respect to the need to re-review the engine airframe combination for 207 min ETOPS. For example the Systems that need to be considered as part of this review should be listed. (The term "ETOPS significant systems" is now used and defined for aircraft certification, see below).

Item 7-1

The requirement to provide a "Numerical Probability Analysis (NPA)" to support a 207 minute diversion, is not sufficiently explicit. It is suggested that more specific criteria be specified along the following lines:-

The ETOPS significant systems (defined below) should be reassessed to ensure their suitability for the extended diversion time, (207 minutes). Systems Safety Analyses (SSA) should be carried out based on the extended diversion time and longest flight time. The re-analysis required (SSA) is to ensure that overall safety objectives are still achieved with the extended diversion time and flight times.

ETOPS significant systems are defined as follows:-

1. A system for which the fail-safe redundancy characteristics are directly linked to the number of engines, e.g. hydraulic system, pneumatic system, electrical system.

2. A system that may affect the proper functioning of the engines to the extent that it could result in an in-flight shut-down or uncommanded loss of thrust. e.g. fuel system, thrust reverser or engine control or indicating system, engine fire detection system.

3. A system which contributes significantly to the safety of flight and a diversion with one engine inoperative, such as back-up systems used in case of additional failure during the diversion. These include back-up or emergency generator, APU or systems essential for maintaining the ability to cope with prolonged operation at single engine altitudes, such as anti-icing systems.

4. A system for which certain failure conditions may reduce the safety of a diversion, e.g. navigation, communication, equipment cooling, time limited cargo fire suppression, oxygen system.

   A system includes all elements of equipment necessary for the control and performance of a particular major function. It includes both the equipment specifically provided for the function in question and other basic equipment such as that necessary to supply power for the equipment operation.

Items 7-5, 7-7 and 7-8

Although there is not a disagreement with the inclusion of these items, they should already be covered by the Type Design Approval for 180 minutes ETOPS.

Item 7-9

The purpose for this item is not clear as it defines a basic type design requirements for most modem twinjets. It may be better to state that "any one of the engine or APU driven generator sources shall be cable of powering all main essential and standby (emergency) AC and DC busses". It would also be more appropriate and necessary to require that all essential functions or systems can be supplied with electrical power to ensure continued safe flight and landing following any single failures or combination of failures not shown to be extremely improbable. This in effect requires the provision of a non-time limited emergency power source capable of continuously supplying all essential functions. The list of services that need to be supplied should be reassessed for 207 minutes diversion times, but should include at least the following:-

(i) attitude information;
(ii) adequate radio communication and intercommunication capability;
(iii) adequate navigation capability (including weather radar);
(iv) adequate cockpit and instrument lighting, Emergency lighting and landing lights;
(v) sufficient captain and first officer instruments, provided cross-reading has been evaluated;
(vi) heading, airspeed and altitude including appropriate pitot/static heating;
(vii) adequate flight controls including auto-pilot;
(viii) adequate engine controls, and restart capability with critical type fuel(from the stand-point of flame out and restart capability) and with the aeroplane initially at the maximum relight altitude;
(ix) adequate fuel supply system capability including such fuel boost and fuel transfer functions that may be necessary.
(x) adequate engine instrumentation;
(xi) such warning, cautions, and indications as are required for continued safe flight and landing;
(xii) fire protection (cargo, APU and engines);
(xiii) adequate ice protection including windshield de-icing;
(xiv) adequate control of cockpit and cabin environment including heating and pressurisation, and,
(xv) ATC Transponder

As well as conducting a re review of the ETOPS significant systems and SSA to establish the suitability for 207 min ETOPS diversion times, an actual test flight should be conducted to confirm that continued safe flight and landing is assured, assuming a maximum diversion time, effectively with an engine out and on emergency or standby power.

Executive Summary - B777 Reliability Study

This states that *"Boeing twin engine jetliners have logged close to 1.4 million ETOPS flights. During this vast experience, there has never been a diversion of 180 minutes duration."* However, the current ETOPS rule time of 180 minutes has only been applicable for a relatively short period of time. Therefore only a proportion of the quoted 1.4 million ETOPS flights is relevant to the 180 minutes criteria.

General

Is there any likelihood of the enhance ETOPS system requirements that safeguard against hazards which are not a function of the number of engines (e.g. cargo fire suppression) going to be applicable to all aeroplanes on extended range operations?